REMARKS

In response to the Office Action dated May 31, 2005, claims 1, 11, 18, 24 and 25 have been amended. Therefore, claims 1, 3-5, 7-25, and 27 remain in the case. In light of the amendments and arguments set forth herein, reexamination and reconsideration of the application are requested.

Section 102(a) Rejections

The Office Action rejected claims 1, 3-5, 7-10, 25, and 27 under 35 U.S.C. § 102(a) as being anticipated by a paper by Eric Brill and Robert C. Moore entitled "An Improved Error Model for Noisy Channel Spelling Correction" (hereinafter Brill et al.). The Office Action stated that Brill et al. disclose all the elements or features of the Applicants' claimed invention.

In response, the Applicant respectfully traverses these rejections based on the amendments to claims 1 and 25 and the legal and technical analysis above and below. In general, the Applicants submit that Brill et al. is missing at least one element or feature of the Applicants' claimed invention. In particular, as explained in detail below, Brill et al. do not disclose, either explicitly or implicitly, the claimed feature of segmentations that have a longer length being assigned a lower cost.

Amended Independent Claim 1

Amended independent claim 1 of the Applicants' claimed invention includes a method for spelling correction of a phrasal string. The method includes segmenting the phrasal string into a plurality of different segmentations, using dictionary looping to spell correct each of the plurality of different segmentations, and determining a cost associated with each of the plurality of different segmentations, the plurality of different segmentations including contiguous sub-strings over the phrasal string, each of the contiguous sub-strings containing a plurality of words. The method further includes identifying a segmentation having a lowest cost corresponding to a most probable correct spelling of the phrasal string, wherein segmentations having a longer length are assigned a lower cost.

When determining "the cost of correcting a segmentation, matches having a longer length are favored" (specification, paragraph [0063], lines 1-2). The Applicants' claimed invention achieves this by "computing an average length-adjusted segment distance" (specification, paragraph [0063], lines 5-6). If the Applicants' claimed invention did not have this feature, then "little would be gained by having multiword phrases in the phrasal dictionary" (specification, paragraph [0063], lines 4-5). However, the "present invention avoids this problem by computing an average length-adjusted segment distance" (specification, paragraph [0063], lines 5-6). For example, using "standard edit distance, distance(pictures of, pictures ff)=1, distance(pictures,pictures)=0 and distance(of,ff) = 1. However, using the average length-adjusted segment distance, distance(pictures of, pictures ff)=1/11, and distance(pictures,pictures) + distance(of,ff) = 0/8 + ½. Thus, the longer match is rewarded and assigned a lower cost" (specification, paragraph [0063], lines 6-10).

In contrast, Brill et al. uses a standard edit distance. In particular, when training the model, the letters in s_i are aligned with the letters in w_i based on minimizing the edit distance (Brill et al., page 3, Section 3 ("Training the Model"), first paragraph to page 4, line 1). In other words, Brill et al. do not take into account the segmentation length when assigning a cost. The Applicants' claimed feature of segmentations having a longer length being assigned a lower cost is missing from Brill et al.

Amended Independent Claim 25

Amended independent claim 25 of the Applicants' claimed invention includes a method for spelling correction of a misspelled phrasal string containing words, spaces and characters. The method includes dividing the misspelled phrasal string into a plurality of different segmentations containing sub-strings containing a plurality of words, performing dictionary looping of a trie containing a phrasal dictionary to search for each of the sub-strings in the trie, and comparing each of the sub-strings to entries in the trie to find a closest match to the sub-string. The method also includes constructing a corrected phrasal string using the closest sub-string trie matches, wherein matched segmentations

having a <u>longer length</u> are <u>favored over</u> matched segmentations having a <u>shorter length</u>.

As noted above, Brill et al. merely uses a standard edit distance that does not take into account the segmentation length when assigning a cost. The Applicants, therefore, respectfully traverse this rejection of amended independent claims 1 and 25 because Brill et al. do not teach, either explicitly or implicitly, the material claimed feature of segmentations that have a longer length being assigned a lower cost. Because of this missing feature, the §102 rejection cannot stand.

Because the Applicants' claimed invention includes features neither explicitly disclosed nor suggested by Brill et al., the Applicants respectfully submit that the rejections of independent claims 1 and 25 under 35 U.S.C. § 102(a) as being anticipated by Brill et al. has been overcome. Moreover, rejected claims 3-5 and 7-10 depend from amended independent claim 1, and rejected claim 27 depends from amended independent claim 25, and are therefore also novel over Brill et al. (MPEP § 2143.03). The Applicants, therefore, respectfully request reexamination, reconsideration and withdrawal of the rejection of claims 1, 3-5, 7-10, 25, and 27 under 35 U.S.C. § 102(a) as being anticipated by Brill et al.

Section 103(a) Rejections

The Office Action rejected claims 11-24 under 35 U.S.C. § 103(a) as being unpatentable over Brill et al. in view of Birman et al. (U.S. Patent No. 6,616,704). The Office Action stated that Brill et al. disclose all elements of the Applicants' claimed invention except that Brill et al. do "not specifically disclose the method wherein the phrasal string contains a plurality of words." However, the Office Action stated that Birman et al. disclose "the method wherein a phrasal string contains a plurality of words (column 2, lines 54-67: Here, a phrasal string that contains more than one word is spell checked though looping through the phrase until each word has been corrected).

In response, the Applicants respectfully traverse these rejections based on the amendments to claims 11, 18, and 24, and the following legal and technical analysis. It

is the Applicants' position that the combination of Brill et al. and Birman et al. is lacking at least one material element of the Applicants' claimed invention. In particular, the combination of Brill et al. and Birman et al. does not disclose, either explicitly or implicitly, the material claimed feature of assigning a lower cost to segmentations having a longer length. Further, the combination of Brill et al. and Birman et al. fails to appreciate the advantages of this claimed feature. Thus, the Applicants' submit that the combination of Mogilevsky and Ristad et al. cannot make obvious the Applicants' claimed feature of assigning a lower cost to segmentations having a longer length.

To make a prima facie showing of obviousness, all of the claimed features of an Applicant's invention must be considered, especially when they are missing from the prior art. If a claimed feature is not disclosed in the prior art and has advantages not appreciated by the prior art, then no prima facie showing of obviousness has been made. The Federal Circuit Court has held that it was an error not to distinguish claims over a combination of prior art references where a material limitation in the claimed system and its purpose was not taught therein. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Moreover, as stated in the MPEP, if a prior art reference does not <u>disclose, suggest or provide any motivation</u> for at least one claimed feature of an Applicants' invention, then a prima facie case of obviousness has not been established (MPEP § 2142).

Amended Independent Claim 11

Amended independent claim 11 of the Applicants' claimed invention includes a method for spelling correction of a misspelled phrasal string containing words, spaces and characters. The method includes receiving the misspelled phrasal string, dividing the misspelled phrasal string into a plurality of segmentations containing sub-strings having a plurality of words, and comparing each of the plurality of segmentations to entries in a dictionary. The method further includes determining a best segmentation from the plurality of segmentations that represents the most probable correct spelling of the misspelled phrasal string. The best segmentation is the segmentation that has the lowest cost, wherein segmentations having a <u>longer length</u> are assigned a <u>lower cost</u> over

segmentations having a shorter length.

Amended Independent Claim 18

Amended independent claim 18 of the Applicants' claimed invention includes a phrasal spelling correction system for spelling correction of a phrasal string. The system includes a segmentation module that divides the phrasal string into a plurality of segmentations, each of the plurality of segmentation containing sub-strings containing a plurality of words, and a looping comparator that performs dictionary looping to correct a segmentation by looping through a dictionary and comparing each of the sub-strings of the segmentation with entries in the dictionary to determine a closest match. The system further includes an output string containing a corrected segmentation having the lowest cost that represents a correct spelling of the phrasal string. Segmentations having a longer length are assigned a lower cost over segmentations having a shorter length.

Amended Independent Claim 24

Amended independent claim 24 of the Applicants' claimed invention includes a method for spelling correction of a phrasal string. The method includes segmenting the phrasal string into a plurality of different segmentations containing sub-strings having a plurality of words, and using dictionary looping to perform a plurality of different searches through a dictionary data structure such that each of the different searches begins at a starting node and continually loops back to the starting node to begin another search in order to compare each of the sub-strings with entries in the dictionary data structure. The method further includes determining a cost for correction associated with each of the plurality of different segmentations. Segmentations having a longer length are assigned a lower cost as compared to segmentations having a shorter length. The method also includes identifying a segmentation having a lowest cost of correction corresponding to a most probable correct spelling of the phrasal string.

As noted above, Brill et al. merely uses a standard edit distance that does not take into account the segmentation length when assigning a cost. Moreover, Birman et al. add nothing to the cited combination that would render the Applicants' claimed

invention obvious. Birman et al. merely disclose a method that uses a standard edit distance to determine a cost. In particular, Birman et al. teach that "Δ is the maximal edit distance for determining whether a candidate word is acceptable; i.e., if the edit distance between G and a candidate word C exceeds Δ, then C is unacceptable" (Birman et al., col. 1, lines 64-67). Consequently, no motivation or suggestion for this claimed feature of the Applicants' invention is provided. Absent this teaching, motivation or suggestion, Ristad et al. cannot render the Applicants' claimed invention obvious (MPEP § 2143.01).

Brill et al. and Birman et al. also both fail to appreciate or recognize the advantages of the Applicants' claimed feature of assigning a lower cost to segmentations having a longer length. More specifically, if standard edit distance was used, "then little would be gained by having multiword phrases in the phrasal dictionary" (specification, paragraph [0063], lines 4-5). The advantage, therefore, of the Applicants' claimed feature, is that the multiword phrases can be corrected as easily as single word. This is because the "longer match is rewarded and assigned a lower cost" (specification, paragraph [0063], line 10). Neither Brill et al. nor Birman et al. discuss or appreciate these advantages of the Applicants' claimed feature of assigning a lower cost to segmentations having a longer length.

The Applicants, therefore, submit that obviousness cannot be established since the combination of Brill et al. and Birman et al. fails to teach, disclose, suggest or provide any motivation for the Applicants' claimed feature of assigning a lower cost to segmentations having a longer length. In addition to explicitly lacking this feature, the combination of Brill et al. and Birman et al. also fails to implicitly disclose, suggest, or provide motivation for this feature. Further, the combination of Brill et al. and Birman et al. fails to appreciate advantages of this claimed feature.

Therefore, as set forth in *In re Fine* and MPEP § 2142, the combination of Brill et al. and Birman et al. does not render the Applicants' claimed invention obvious because the references are missing at least one material feature of the Applicants' claimed

invention. Consequently, because a prima facie case of obviousness cannot be established due to the lack of "some teaching, suggestion, or incentive supporting the combination", the rejection must be withdrawn. <u>ACS Hospital Systems, Inc. v. Montefiore Hospital</u>, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984); MPEP 2143.01.

Accordingly, the Applicants respectfully submit that amended independent claims 11, 18, and 24 are patentable under 35 U.S.C. § 103(a) over Brill et al. in view Birman et al. based on the amendments to claims 11, 18, and 24, and the legal and technical arguments set forth above and below. Moreover, claims 12-17depend from amended independent claim 11, and claims 19-23 depend from amended independent claim 18, and are also nonobvious over Brill et al. in view Birman et al. (MPEP § 2143.03). The Applicants, therefore, respectfully request reexamination, reconsideration and withdrawal of the rejection of claims 11-24.
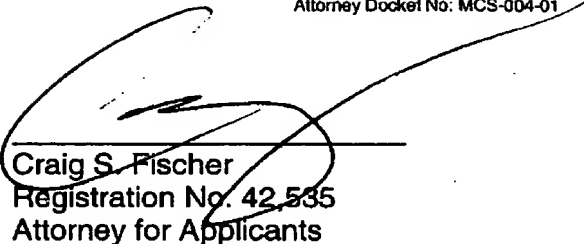
Conclusion

In view of the amendments to claims 1, 11, 18, 24, and 25, and the arguments set forth above, the Applicants submit that claims 1, 3-5, 7-25, and 27 of the subject application are in condition for immediate allowance. The Examiner, therefore, is respectfully requested to withdraw the outstanding rejections of the claims and to pass this application to issue.

In an effort to expedite and further the prosecution of the subject application, the Applicants kindly invite the Examiner to telephone the Applicants' attorney at (805) 278-8855 if the Examiner has any comments, questions or concerns, wishes to discuss any aspect of the prosecution of this application, or desires any degree of clarification of this response.

                                    Respectfully submitted,
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